

THE EFFECT OF CHINA'S SCRAMBLE FOR RESOURCES AND AFRICAN RESOURCE NATIONALISM ON THE SUPPLY OF STRATEGIC SOUTHERN AFRICAN MINERALS: WHAT CAN THE UNITED STATES DO?

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The continued free market supply of strategic minerals from Southern Africa is a matter of importance for the United States government. US defense industries require strategic minerals for the manufacture of systems which are critical to US national security. In the coming years the free market supply of Southern African strategic minerals could become diminished, and US national security interests could be adversely affected as a result. Areas of particular concern include infrastructure problems in the region, African resource nationalism and Chinese demand-driven intervention in Southern Africa.

PROJECT SUMMARY

This report builds upon the 2010 INSS Research Paper titled “Sustainability of Strategic Minerals in Southern Africa and Potential Conflicts and Partnerships” concerning the sustainability of the supply of mineral resources from Southern Africa that are strategic to the United States.¹ This report focuses on competition and potential conflict over strategic minerals caused by Chinese demand-driven activities and African resource nationalism. These are the two variables which can most cause dramatic contractions in strategic minerals supply. This report provides additional analytical depth and makes definitive predictions; and it also broadens the scope of analysis to include the platinum and chromium-rich but troubled country of Zimbabwe. Also, this report weighs the role of US-African strategic partnerships, national security planning (and theater security cooperation) and US Africa Command (AFRICOM) in securing long term access to strategic minerals. There are several Priority Topics that are important to sponsors of the research and interested parties in the US government.² This report analyzes China’s strategy for resource access as manifested in Southern Africa, implications for the use of soft power, and ramifications for US national security. The report examines the emerging character of conflict and prospects for resource warfare. The project’s significance is manifested in analysis regarding the sustainability of mineral resources in Southern Africa that are strategic to the United States in Africa and scenarios in the medium term and long run in regard to US access. Special analysis is provided regarding China’s strategy of using soft power and African resource nationalism, as well as the potential for eventual conflict over resources in Southern Africa between the United States and China. An assessment is provided regarding the potential for strategic partnerships in Southern Africa to help secure US access to critical resources.

^{*} The opinions expressed in this paper are those of the author and do not necessarily reflect the opinions and policies of the US Air War College, the US Air Force, the Department of Defense, or any other US Government branch.

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RESEARCH OBJECTIVES

This report determines relevant US policy gaps in regard to strategic resources from Southern Africa. Potential solutions are provided for the continuing supply of strategic resources from Southern Africa. Military implications are identified concerning the struggle for strategic resources, especially in Southern Africa. The United States is more dependent than most countries for the supply of defense critical resources, due to the size of its defense industries and reliance on high technology. The fundamental problem is that manufacturing industries have continued to leave the United States for China, creating the possibility that US defense industries may become dependent on China. The research analyzes China's strategy for resource access and its use of soft power. The research also assesses the role of strategic resources in fostering conflict and the evolving character of resource conflict. The project examines the US understanding of future threats, specifically the depletion of strategic resources, and the US posture to respond and defend its interests, using the instruments of power and across the spectrum of warfare.³ The research report recommends responses to forms of conflict and warfare over strategic resources.

CRITICAL NATURAL RESOURCES DEPENDENCIES IN SOUTHERN AFRICA AND US SECURITY INTERESTS

Mapping the sources of strategic minerals and critical defense resources from Southern Africa indicates future challenges for the United States. Ninety percent of the world's platinum group metals are found in Southern Africa. Most of the world's cobalt (>50%), a high concentration of chromium (>50%), and much of the highest quality manganese are also found in the region. Given the high concentration of mineral resources, alternative sources of supply are not as robust as for other minerals. Therefore, it is in the US national interest to maintain a secure and steady supply of strategic minerals from Southern Africa for decades to come.⁴

Supply and Demand Constraints

The United States is overly dependent and susceptible to the following supply and demand constraints:

1. Supply constraints (from resource nationalism in African countries).
2. Demand constraints (from China, India and other countries).
3. Supply (infrastructure): electricity, railways, water, as well as poor education and skills.
4. Supply (labor and governance): labor costs, strikes, regulation and corruption.
5. Demand (technology): increased uses for metals, e.g., hi tech components, batteries, etc.⁵

The focus of this report is on the two most variable factors – resource nationalism and Chinese demand-driven activities.

A potential constraint on the supply of strategic minerals is the lack of a US industrial policy and contingency plans in case the flow of minerals is diverted. Guaranteeing the supply of strategic minerals

from Southern Africa deserves the attention of the US government, which should be planning for various contingencies, particularly for the 2020s and beyond. The region contains high concentrations of platinum group metals (PGMs), cobalt, manganese, chromium, vanadium, fluorspar, and titanium, and alternative sources are not abundant in other parts of the world. The industries of the United States and its allies depend on the free market for Southern African minerals, and US defense industries depend on these minerals for the manufacture of aircraft, aerospace systems, ships, and high technology components which are important for US national security. By the 2020s, the free market and US national security interests could be adversely affected. The poor infrastructure of the region (electricity, railroads, roads, and skills) means sub-optimal production of minerals, with limited prospects for expanded supply. Less predictable is the impact that Chinese demand-driven intervention and African resource nationalism (mine nationalization, state-owned mining companies, and indigenization) will have on the free market and future flows. In a worst case scenario, resource nationalism will further drive down production and supply, while Chinese monopolization of minerals will dry up free market supply for the United States and its allies in the 2020s and beyond.⁶ Thus, this report focuses on resource nationalism and Chinese demand.

The 2010 Research Paper dealt with some of these constraining factors, while the 2011 report provides more depth in the analysis of the impact of resource nationalism and Chinese demand-driven activities. More importantly, this report determines which factors are most important in the short and medium term (e.g. resource nationalism) and in the long run (e.g. Chinese monopolization of strategic minerals). In brief, the range of views among mining experts differed substantially. Many Southern African mining experts think that infrastructure is the greatest obstacle in the short and medium term.⁷ A growing number of experts think that politics and resource nationalism are the greatest problem today and in the medium term.⁸ A few thought that Chinese off-take agreements are a growing threat that could become as serious as electricity shortages and infrastructure deficiencies, especially in the medium to long run.⁹

Given the range of views, my evaluation is that, in the short term, infrastructure remains the major impediment to sustaining and developing mining in South Africa, and it is a problem in the Democratic Republic of the Congo (DRC), Zambia, Zimbabwe and Namibia. Resource nationalism is inhibiting further investment and development in South Africa, Zimbabwe, and the DRC. Chinese involvement is already having an impact in the DRC, as well as Zimbabwe and Zambia and may soon do so in Namibia. In South Africa, infrastructure and resource nationalism will be the greatest problems in the short term and the medium term. In the long run, Chinese demand-driven activities will seek to dominate the South African mining industry and minerals and metals markets. For Southern Africa, resource nationalism and demand from China and Asia will become increasingly important in affecting

and even threatening the supply of strategic minerals to the United States. A change in US strategy regarding strategic minerals combined with contingency planning and policy measures can mitigate these negative trends.

RESOURCE NATIONALISM

The surge in Southern African resource nationalism over the past decade is a sign of growing populism in response to chronic inequality in the sub-region. Ruling parties, many of which were formerly socialist-oriented liberation movements have made promises of employment and development. However, they have been unable to deliver on many of their promises, and many leaders are turning to populism in striving to stay in power. Resource nationalism is also a sign of the long-standing divide between African ruling parties and Western and South African mining companies which have been seen as colonialist and capitalist exploiters. Resource nationalism has taken the form of “indigenization” programs, promising to “trickle down” benefits from local black businessmen who form companies to take over interests in mining operations. However, thus far, results of indigenization have generally been disappointing, with very little trickle down occurring.

In several countries, state mining companies have been created or revived and provided with competitive advantages. At times, they have been used to mine non-profitable but strategic minerals and to create jobs. Nationalization of mines has been mooted in several countries, with the promise of job creations and social benefits. However, Zambia and the DRC suffered through failed mine nationalization experiments in the 1970s and 1980s, with Zambia re-privatizing the mines in 1998.

The 2010 Research Paper analyzed the rise of resource nationalism in Southern Africa, which continues to grow in intensity. For example, in the 2010 Research Paper, it was predicted that major changes would be taking place in Namibia’s previously tranquil mining industry. In May 2011 the Namibian government acted, contrary to the expectations of some experts. Namibia’s Mines and Energy Minister Isak Katali announced that uranium, copper, gold, zinc and coal had been declared strategic minerals which were to be mined with the participation of the state-owned mining company, Epangelo. The company would have least a 26 percent stake in companies that were mining strategic minerals.¹⁰ Epangelo was recently formed and has been severely under-capitalized, which has raised questions about how it would pay for its stakes.

South African Resource Nationalism

South African resource nationalism is set against the backdrop of a government that has not been able to deliver on many of its promises of employment and greater prosperity for the impoverished masses. South Africa’s macroeconomic performance remains satisfactory but is undergoing stresses.¹¹ Job creation remains the highest priority for the government, and the government’s New Growth Path for

South African development has been designed to deal with unemployment. It calls for modest economic liberalization with considerable state intervention and a mixed economy.¹²

South African resource nationalism has become an immediate problem for the mining industry, a disincentive for investors, and a source of continued decline for South Africa's mining industry. The 2010/2011 Fraser Institute survey of mining investors ranks South Africa 67th out of 79 countries; South Africa has declined as an investment destination in ten years from a middle range country to the bottom quartile. Despite the high concentration of strategic minerals, mining has been a declining industry since majority rule in 1994.

The South African National Planning Commission, headed by former Finance Minister Trevor Manuel, pointed out in its "Vision for 2030," submitted to the government in November 2011, that the country's mining industry needs investment above all. During the global commodity boom of 2001-2008, it shrank by an average of one percent a year, whereas the world's other top 20 mining-export countries grew by an average of five percent a year.¹³

The principal problem is that South Africa has suffered from the increasingly arbitrary role of the government and rising levels of political uncertainty, caused by a number of resource nationalist actions by the government and ruling party. Mining industry expert, Peter Leon points to five factors that have contributed to decline. These include "the upheaval of the previous minerals regulatory regime;" a "lack of regulatory certainty and maladministration" and a "flawed Black Economic Empowerment policy;" as well as the "spectre of mine nationalisation" and the "state-owned mining company."¹⁴

The 2002 Mining Law in effect nationalized minerals and enabled the government to play a role in granting mining rights and created ownership and regulatory uncertainty.¹⁵ The law included a "Mining Charter" that mandated a "black economic empowerment" (BEE) requirement of 26 percent ownership by black-owned companies. This requirement has created regulatory uncertainty and has been abused in several high-profile cases.¹⁶ In 2007 the state-owned mining company, African Exploration, was revived and given exemptions from regulation in order to make it competitive with private companies.¹⁷ Many mining industry experts and investors saw African Exploration as a Trojan horse, which would be a vehicle for mine nationalization.¹⁸

In 2009, Julius Malema, who had become the head of the African National Congress (ANC) Youth League in 2008, began calling for mine nationalization. Before Jacob Zuma became President in 2009, the ruling ANC would have exercised party discipline and stopped someone like Malema from continuing his campaign. However, Zuma's ANC failed to rein in Malema for two years, until he called for "regime change in Botswana." The repeated calls of Malema and other Youth Leaguers for nationalization have done much to cause investors to shy away from South Africa. Instead of squelching nationalization talk, the ANC has commissioned a feasibility study to investigate the viability of mine nationalization.¹⁹ The issue is to be

considered at the December 2012 ANC congress. If the ANC agrees to some form of mine nationalization, legislation would go forward in 2013. If the government decides to pay compensation, it will have a hard time raising the revenue. If it decides to nationalize without compensation, the results could be devastating, including a drop in the production and export of strategic minerals, including PGMs, chromium and manganese. US industries that rely on strategic minerals could be adversely affected. With mine nationalization, investors would depart South Africa, and the country's mining industry would decline further.

Questions have arisen about the mechanisms for mine nationalization, especially whether African Exploration would play a role in nationalization or black empowerment (BEE) companies or a combination of the two. Even if nationalization occurred without compensation, it is assumed that the South African state would contract Western companies to run the mines. This would be especially necessary in the case of PGM mining, which needs high levels of technical expertise. Nationalization would mean no new investments in PGM mining and stagnation and decline. In regard to chromium and manganese mining and ferroalloy production, one would expect China to play a greater role in export of raw ore and ferroalloys as well as efforts to establish joint ventures with BEE companies to mine and process ore.

The basis of the ANC government's resource nationalism lies in the history of the mining industry in which whites dominated and blacks were exploited as unskilled laborers. Thus, the ANC and Congress of South African Trade Union (COSATU) harbor an animosity against mining companies that goes back decades. A sign of the ANC's antipathy towards the mining industry came in Mineral Resources Minister Susan Shabangu, who said the gold and platinum sectors were the "enemy of workers" when it comes to mine accidents.²⁰ Mining industry experts point out that mine nationalization without compensation would mean that mineworkers would lose their pensions; therefore, the National Union of Mineworkers (NUM) has opposed mine nationalization, whereas other COSATU leaders tend to support nationalization.

One possible route to mine nationalization would arise if the price of gold dramatically declines and the gold mines are forced to close. The gold mines are often four kilometers deep and need a high gold price in order to afford the technology to keep the mines open. If gold mines started closing, the South African government would intervene and nationalize the gold mines, which would open the door to the nationalization of other mining industries.²¹

Another resource nationalist proposal is to establish strategic mineral "exchanges" in which minerals would be stockpiled to ensure price stability and encourage greater "beneficiation" inside South Africa.²² Mining industry experts have criticized proposals for mineral exchanges and compulsory beneficiation as uneconomic and unworkable.²³

In regard to South Africa, views of mining industry experts range from mildly optimistic to very pessimistic. The mild optimists have counted on the moderate wing of the ANC to forestall resource nationalism and perhaps even revive the mining industry. Several experts cling to this hope, based on the history of sound macroeconomic policies since 1994.²⁴ It is significant that the Minister of Mining Resources, Susan Shabangu, and the Minister for Public Enterprises, Malusi Gigaba, have come out against nationalization.²⁵ Also, the suspension of Julius Malema from the ANC for five years has robbed the ANC Youth League of its most prominent nationalization proponent.

Pessimists point out that the 2002 Mining Law, the de facto nationalization of minerals, and the Mining Charter opened the door to political interference in the mining economy, which was followed by BEE abuses and calls for mine nationalization. In spite of the abuses, the government continues to push ahead with transformation of the mining industry. Malema and others have been scaring away investors with talk of nationalization. One mining investment expert referred to the nationalization push, the state mining company and other government actions as “death by a thousand cuts.”²⁶ Since there is little or no capital for nationalization, wholesale takeovers can only be achieved largely without compensation. Otherwise, nationalization will be piecemeal.²⁷

Severe pessimists believe that nationalization of the mines in South Africa is inevitable. Their position is reflective of a broader unease with the direction that South Africa has been heading, especially over the last three years of the Zuma administration.²⁸

The likely outcome is somewhere in between the status quo and nationalization. President Zuma is determined to be reelected in April 2014; some suspect that the mining sector might be the sacrificial lamb to help him achieve his objective. It is possible that nationalization will not be wholesale; some mines may be nationalized, and some will not. The South African government is looking at Brazil as a model for increasing tax rates on the mining industry; since by Latin American standards, the South African mining sector is under-taxed.²⁹ Whatever is done, it is likely that resource nationalism will continue to concern foreign investors, who will remain reluctant to invest in South Africa. Also, local investor confidence will continue to stagnate, and the supply of strategic minerals will not increase. The Fraser Institute’s ranking of South Africa as a place to invest in mining exploration is likely to stagnate in the bottom quartile.³⁰ In the medium and long term, resource nationalism will continue to place downward pressure on South African mining industry. It will suppress the supply of strategic minerals and make the scramble for them more intense in the years and decades to come.

Resource Nationalism in Zimbabwe

From 2000 to 2008, President Robert Mugabe and the ruling party, ZANU-PF, destroyed the economy of Zimbabwe and posed serious risks for mining investors and for the flow of strategic minerals, including PGMs and chromium. In 2000, Mugabe ordered the takeover of white-owned commercial farms

without compensation resulting in the collapse of agricultural production and exports, halving of the GDP and causing a dramatic rise in investors' risk perceptions. In 2007, an "Indigenization" law was passed in anticipation of 2008 elections, which mandated the transfer of 51 percent of mine ownership to local entities. As 2012 elections loom, Mugabe and his Indigenization minister led in striving to enforce the indigenization law, with deadlines for mining companies to submit and implement plans for the transfer of majority ownership to Zimbabwean entities. As a result of Mugabe's resource nationalism, the 2010/2011 Fraser Institute survey of mining investors ranked Zimbabwe 71st out of 79 mining countries.

In spite of the high level of risk and threats from government officials, one of the largest South African PGM mining companies (Zimplats in Zimbabwe), has invested \$500 million in a platinum refinery in Zimbabwe. Additionally both Impala and Anglo Platinum have invested billions of dollars in platinum mining in Zimbabwe.³¹ The reason is that the platinum ore is relatively close to the surface and less costly to mine than in South Africa. In response to the Indigenization Law, Aquarius and other mining companies have offered 26 percent local ownership and an amount equivalent to 25 percent ownership in social benefits.³² However, Mugabe and his Indigenization minister have threatened to cancel the mining permits of Zimplats and others companies if they do not fully comply.³³ Chinese companies have been exempted from the law, which can be seen as part of Mugabe's "look east" policy. Also, the Zimbabwe government has announced that it is considering a ban on raw platinum exports, which would dramatically reduce the flow of PGMs from Zimbabwe.³⁴

The Movement for Democratic Change (MDC), which won the 2008 parliamentary elections and expects to win the 2012 elections, is a moderating force. President Mugabe is approaching 90 years of age and has been in failing health. However, several top military officers have rejected the possibility of the MDC taking power and threatened a coup.

The range of views on the Zimbabwe mining industry extends from optimistic to very pessimistic. There are mining industry insiders who consider Mugabe's resource nationalism to be largely rhetoric.³⁵ Other optimists think that Mugabe's days are numbered.³⁶ Pessimists include the Fraser Institute and investors from outside the region who are unlikely to take risks. There are those pessimists who are fearful of the possibility of a military coup, which creates additional uncertainty. The beneficiaries of uncertainty are likely to be some of the ZANU-PF inner circle as well as Chinese companies.

The likely outcome is hard to determine. Foreign investors who are not familiar with Zimbabwe will continue to stay away. If ZANU-PF stays in power or the military seizes power, the air of turbulence and uncertainty is likely to remain. However, if the MDC wins the forthcoming elections and is able to take power, and the military refrains from staging a coup, the situation could improve. Because of political

uncertainty, PGM mining could either decline or dramatically increase in the next four years, and the flow of PGMs and chromium from Zimbabwe could either diminish or increase.

Resource Nationalism in the DRC

In the Democratic Republic of the Congo (DRC), President Joseph Kabila leads a neo-patrimonial regime in a recovering failed state. The state owned mining company (Gecamines) plays a role in mining deals and patronage, including the 2008 “Sicomines” deal with China. In 2010, the DRC government expropriated, without explanation, First Quantum’s (of Canada) rights to exploit two Kolwezi copper/cobalt mines and mine tailings. Dan Gertler (President Kabila’s Israeli advisor) bought the mining rights and sold them to a Kazakh mining company. This arbitrary act highlights the high levels of risk facing mining companies in the DRC as well as the negative role played by Dan Gertler.³⁷

In regard to resource nationalism, a struggle has emerged between President Kabila and Katanga Governor Katumbi, who has constructed a power base and is well-regarded in some Western quarters. This has spawned fears of instability in Katanga and a rising risk to cobalt production and supply. Katanga Province has always been the more industrial and developed region of the country and experienced secessionist rebellions in the 1960s and 1970s. In the past, whenever there was friction between the central government in Kinshasa and the Katanga provincial government, the dictator Mobutu would order power cut from Inga Dam to the copper mines. Today, the issue revolves around revenues from mining in Katanga that flow to the capital, Kinshasa, and do not flow back to Katanga.³⁸ One mining executive with strong involvement in the DRC is concerned that these differences will boil over into conflict, which could seriously disrupt the supply of cobalt and copper to the world.³⁹ President Kabila has been reelected and is due to serve until 2016 and is likely to keep the pressure on Katanga. Tensions between Katanga and Kinshasa will continue, and a major escalation could threaten the supply of copper and cobalt.

The views of the DRC range from pessimistic to guardedly optimistic. Oddly, one very experienced mining industry entrepreneur is quite bearish on the DRC, while being exceedingly bullish on Zimbabwe.⁴⁰ The DRC will continue to witness government interference in the mining industry, which will continue to concern investors. The Chinese may be able to operate under conditions of uncertainty, but Western companies and investors find it daunting. As a result, more cobalt and copper will flow to China.⁴¹

CHINESE DEMAND-DRIVEN ACTIVITIES AND STRATEGY FOR RESOURCE ACCESS⁴²

China has developed a strategy to secure guaranteed supplies of strategic minerals, including the widespread use of “off-take agreements” with governments and companies worldwide and the imposition of export controls on rare earths and other minerals that are critical for Chinese industries. In response to

export controls on several strategic minerals, including those that come from Southern Africa, the World Trade Organization has brought cases against China. In 2007, China identified five strategic reserve minerals (including cobalt, copper, and manganese with heavy concentrations in Southern Africa). China launched a plan to stockpile 500,000 metric tons of manganese, 200,000 of copper, and 300 of cobalt; which amounted to 90-180 days of imports. The estimated cost of the stockpile was \$2.7 billion. The stockpile plan is operational today and includes rare earth minerals.⁴³

China has been aggressively implementing its strategy for resource access in seeking mineral resources in Southern Africa.⁴⁴ Chinese state-owned and private companies operate in most every African state, and in Southern Africa, some have formed joint ventures with state-owned firms and “black empowerment” companies. China has used soft power in building infrastructure, roads and bridges in Southern Africa in exchange for gaining access to guaranteed supplies of strategic minerals.⁴⁵ China also takes a long-term view in regard to the expansion of mining activities into Southern Africa.⁴⁶

One problem that Chinese companies face is that they are more hierarchical than South African and Western companies. This basic cultural difference means that every Chinese decision goes up many ranks to the top and then down many ranks, no matter how minor the issue. This slows down Chinese takeover bids, especially in a competitive economy like South Africa’s.⁴⁷ However, China’s Jinchuan Group competed with and eventually prevailed over Brazil’s Vale in a more than \$1 billion takeover bid for South Africa’s Metorex, which had been heavily involved in mining copper and cobalt in Zambia and the DRC for more than three decades.⁴⁸

The range of views of Chinese demand-driven activities in Southern Africa extends from very critical to positive.⁴⁹ Chinese demand-driven activities will in the long run mean that the flow of strategic minerals will head increasingly to China. Together with resource nationalism and poor infrastructure, US access to strategic minerals from Southern Africa will diminish and be threatened in the next ten to twenty years or so.

Chinese Activities in the Democratic Republic of the Congo

Ninety percent of China’s cobalt comes from the DRC (Katanga Province) and Zambia (Copperbelt Province) (see the map in Appendix A); Chinese access to cobalt and copper has dried up in the rest of the world.⁵⁰ In 2008, China and the DRC (and Gecamines – the state mining company) made a \$6 billion concession deal - called “Sicomines” - (originally it was a \$9 billion deal that was reduced to \$6 billion after an intervention by the International Monetary Fund) for more than 10 million metric tons of copper and more than 600,000 metric tons of cobalt. Three major Chinese companies were involved: China Railway Group, Sinohydro Corporation, and Metallurgical Group Corporation. These companies have a controlling interest of 68 percent. The Congolese parastatal, Gecamines, has a 32 percent interest.

Presently, almost \$1 billion has been committed by China's Export-Import Bank for infrastructure development in exchange for copper and cobalt.

Cobalt is the most high-profile strategic mineral that the DRC and Zambia produce, and cobalt experienced rising demand and aggressive intervention by Chinese companies, especially in the mid-2000s. Demand skyrocketed from 2002 to 2008 with a resulting rise in prices.⁵¹ The DRC (Katanga Province) is the world's largest cobalt producer at 34 percent of global output, and next-door Zambia (Copperbelt Province) is second at twenty percent. Appendix A contains a map of the copper and cobalt mining regions of DRC's Katanga Province and the Copperbelt Province of Zambia.⁵²

In terms of the effect on the supply of cobalt, the Chinese could eventually buy large amounts of copper, which could mean large amounts of cobalt flooding the market, which could depress the price and make it non-economic to mine cobalt. However, at the moment, demand for cobalt has been driving prices higher, with a short plateau in 2009 and 2010. On the other hand, instability in Katanga could disrupt production and threaten supply.

As part of the Sicomines deal, China is building a road network stretching for four thousand kilometers (2,400 miles) and a railway system spanning 3,200 kilometers (1,920 miles). This is a much needed development in a country the size of Western Europe and the second largest in Africa but with only two hundred kilometers (120 miles) of tarred road. The building of a transport network is of strategic importance to the Chinese. It will make it easy to transport the copper and cobalt from mines in the land-locked Katanga region to the coast.⁵³

The six billion dollar Chinese investment in the DRC has raised concerns, especially around environmental consequences and transparency issues.⁵⁴ A most notable part of the deal was China's demand that the DRC guarantee repayment of infrastructure investments should profits from mining project be insufficient.⁵⁵ A most notable part of the deal was China's demand that the DRC guarantee repayment of infrastructure investments should profits from mining project be insufficient.⁵⁶ Chinese investors complain about the lack of security in the DRC and about their own government not providing enough support. Initially the International Monetary Fund (IMF) indicated that it was not willing to continue a three year poverty reduction and growth program, if the DRC government was potentially beholden to China in terms of debt. There has also been criticism from those who fear that the government has, through this deal, found a way to line the pockets of government officials. There were concerns that Congolese negotiators did not have the necessary capacity to take on the Chinese negotiators, a perennial problem besetting African countries in all trade and economic talks. Civil society and other stakeholders in the DRC have expressed concern about the transparency of the deal and have complained that they were not consulted.⁵⁷

There is fear that the Chinese will not honor environmental protocols. A lot of environmental damage has already been done to the DRC by mining activities. Artisanal mining and small operators have already done huge damage by excavating sites without care for plant or animal life. Thus far, the DRC government has not been clear on environmental policies and has not enforced them, with the expectation that investors would assume the responsibility to protect the environment.⁵⁸ In conclusion, China is guaranteeing its source of copper and cobalt and is undeterred by conditions in the DRC.⁵⁹

Chinese Activities in Zimbabwe

In regard to strategic minerals, China and Chinese companies are heavily involved in ferrochrome production and export in Zimbabwe.⁶⁰ A Chinese company owns a majority share of the ferrochrome firm ZIMASCO, which exports large quantities of the metal to China. Also, Chinese companies are involved in the Marange diamond mine trade, which has been restricted until recently by the Kimberley “blood diamond” process.

China has long had an affinity with “liberation movement” regimes and has had an especially close relationship with Zimbabwe President Mugabe and his regime. Mugabe initiated his “look east” policy after the European Union and United States imposed targeted sanctions on Mugabe’s inner circle in 2002. Therefore, Chinese companies are not subject to the Indigenization Law in the same way that South African and Western companies are. However, some mining experts doubt the Chinese technological capacity to mine PGMs.

If the opposition Movement for Democratic Change wins the 2012 elections, it will continue to welcome Chinese investment, though it will not be as dependent as the Mugabe regime. An MDC government would reach out to Western and South African companies for investment. However, if there is a military coup, the pro-ZANU-PF generals will probably want to forge an even closer relationship with China, which could be to the detriment of Western interests.

In spite of the long Chinese relationship with ZANU-PF, China is active in Zimbabwe more for the minerals and less to support Robert Mugabe and his party. In the coming years, Chinese interest in Zimbabwe and its minerals will continue to grow and will attract both ZANU-PF and MDC governments. In contrast, the United States and the West will have less influence.

Chinese Activities in South Africa

Chinese involvement in South Africa is growing but is not as pervasive and dominant as in other Southern African countries, because the South African state and economy are stronger, and mining companies are more technologically advanced than their Chinese counterparts. There are those who think that Chinese companies are a long way off from dominating the PGM mining industry in South Africa.⁶¹

Chinese activities in South Africa are centered on off-take agreements for strategic minerals and establishing joint ventures. In 2010, ASA Metals’ Jiuquan Iron & Steel (Jisco) purchased 26% of South

Africa's International Ferro Metals (IFM) which owns the Buffelsfontein chromite mine and smelter. A Chinese company is partnering with a black empowerment (BEE) company - Wesizwe - to mine PGMs.

Chinese off-take agreements for ferrochrome and ferromanganese and chromite and manganese ore have brought complaints from the South African stainless steel industry about a shortage of supply for local production. Stainless steel industry experts assert that Chinese companies are moving to corner the market on chromium, manganese and vanadium.⁶²

The South African Department of Mining Resources has made Chinese entry into mining in South Africa difficult. For example, DMR put obstacles in the path of the Chinese attempt to take over the BEE PGM firm, Wesizwe, and the Chinese company ended up only gaining a 45 per cent interest. Chinese companies are wary of investing in South Africa because of the uncertainty caused by black economic empowerment.⁶³ However, one must remember that Chinese companies are well-capitalized and backed by the Chinese state.⁶⁴ Also, Chinese officials regularly visit ministers and deputy ministers

Some leaders of the ANC Youth League, the Congress of South African Trade Unions (COSATU), and the South African Communist Party (SACP) are urging a shift towards China, which has become South Africa's largest trading partner and a potential source of greater investment and aid.⁶⁵

China will continue to seek off-take agreements for South African minerals and will slowly penetrate into mining operations. However, Chinese companies will continue to encounter resistance from the South African government and competition from South African companies in attempting to take over or initiate mining operations.

Chinese Activities in Zambia

Zambia features a combination of a backlash against Chinese demand-driven activities and the revival of resource nationalism. Specifically this has involved a reaction to questionable Chinese business practices and the shooting and abuse of mineworkers. Michael Sata's Patriotic Front populist campaigns in 2006 and 2011 against alleged Chinese abuses finally paid off when he was elected president in September 2011. Zambian voters reacted against President Rupiah Banda and Movement for Multi-party Democracy (MMD), which favored Chinese involvement. In 2010, China provided a \$5 billion loan to private companies in Zambia to exploit minerals so that they could be exported to China. However, once in power President Sata ended his campaign against Chinese abuses and sought a rapprochement. This episode demonstrates how dependent Zambia has become on China.

In Zambia, cobalt production was set back in 2007 by the Chinese management's abuses at the Chambishi mine – Chambishi Metals is Zambia's largest cobalt producer - and backlash by mineworkers and politicians.⁶⁶ In 2009, output restarted at Chambishi Metals. Chinese companies remain involved in cobalt mining, especially the Non-Ferrous Metals Mining Corporation. In 2010, China provided a \$5 billion loan to private companies in Zambia, including Vedanta Resources, Canada's First Quantum

Minerals, Equinox Minerals, Glencore International, and Metorex South Africa. In spite of Chinese largesse, Zambian attitudes toward China and the Chinese are more guarded than in the DRC.⁶⁷

SUPPLY CONSTRAINTS: PHYSICAL AND HUMAN INFRASTRUCTURE PROBLEMS AND LABOR CHALLENGES

In the 2010 Research Paper, the problems of physical infrastructure, especially electricity, railways, and water in South Africa and the negative effect on mineral production were analyzed. This report provides more details and updates. One of the overriding problems has been poor management of state-run infrastructure companies. In South Africa, the state-run electricity utility, Eskom, has been badly managed. This has resulted in poor planning and anticipation of power demand in the future. The railway and transportation state-owned company, Transnet, has been managed abysmally. This has meant the railway system has deteriorated and it is difficult to transport strategic minerals and other products for export. In addition, the road system is deteriorating because of the heavy trucks carrying minerals that the railways should have been transporting. Problems of mismanagement and infrastructure shortages are likely to continue for some time to come.⁶⁸

In Zimbabwe, Zambia and the DRC, infrastructure has been crumbling, and electricity is often unreliable. In addition, all three are dependent upon suboptimal South African railways and roads to export their minerals. The vast majority of copper and cobalt goes from Katanga across the border to Zambia (see Appendix A) and then runs to ports in South Africa. Infrastructure declined in the DRC in the 1980s and 1990s to forty percent of its 1960 independence condition and has been slowly recovering since 2003; however, the DRC needs to permit foreign investment back in to the country in order to refurbish its infrastructure.⁶⁹

There are those who think that electricity and physical infrastructure are the major problems in South Africa and other Southern African countries, although the rise of resource nationalism has added another major problem. Infrastructure problems will continue in South Africa and Southern Africa, which will mean sub-optimal production and export of strategic minerals and alloys. Combined with other factors, poor infrastructure could mean that at some stage the United States may not be able to obtain the minerals and alloys that it needs.

Human infrastructure is another problem, especially the lack of skills and the out-migration of skilled mining professional and the poor education system in South Africa and other states (Namibia, Zimbabwe, Zambia and DR Congo). This problem will continue to contribute to the decline of the mining industry in Southern Africa. Therefore, companies are likely to compensate by importing skilled labor from Asia and elsewhere.

Another supply constraint has been high and rising labor costs and strong unions in South Africa.⁷⁰ It is difficult to fire workers in South Africa. Poor management-labor relations have always

existed, with management having the upper hand before 1994 and with labor on top afterwards. Since 1994, the situation for management and investors has deteriorated. In addition, government over-regulation of mines, especially in overemphasizing safety, has shaken investor confidence and caused supply disruptions. The Fraser Institute and others think that labor and government over-regulation have contributed to South Africa's decline as a mining destination.⁷¹ Labor costs and regulation in South Africa have caused decline in the mining industry and will continue to do so.⁷² Talk of mine nationalization has been coupled with COSATU's demands for real wage rises without increases in productivity, which has dampened investor confidence.⁷³ Given labor problems, mechanization may be the answer; however, the prospects for the mechanization of PGMs are not good, given the geology in South Africa.

US POLICY AND SOUTHERN AFRICA MINERALS: WHAT SHOULD THE UNITED STATES DO?

US embassies in South Africa, Zambia, Zimbabwe, Namibia, and the DRC are tracking mining issues and trends. However, US officials are doing very little to negotiate with these governments on the challenges facing mining companies, investors and the free market for minerals.⁷⁴ The United States has relatively few resources available for Southern Africa to compete with the billions of dollars of Chinese aid and investment. Also, there are few US mining companies operating in Southern Africa.⁷⁵ China's strategy for resource access in southern Africa through ore for infrastructure deals has implications for "soft power" which the United States needs to understand and counteract.⁷⁶

One controversial measure that has hindered US involvement in the competition for Congolese minerals is the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act, which restricts US access to minerals where conflict has been prevalent and which has helped shine a light on abuses in the DRC. In the past year, the act has forced some US companies out of the market for Congolese tungsten and tantalum, and Chinese companies have moved in and bought them cheaply. Also, the Dodd-Frank Law is being imposed outside of eastern DRC conflict zones and in cobalt-rich Katanga Province where there is no conflict.⁷⁷

In Zambia, US embassy officials pointed out that Chinese investment in Zambia was more than \$10 billion, while US investment was in the millions.⁷⁸ Therefore, the United States has limited leverage in Zambia, outside of its leadership of the IMF and World Bank.

In contrast to China, the United States has been employing soft power throughout the Southern African region by providing anti-retroviral (ARVs) medications and other assistance to fight HIV/AIDS. This has helped to win hearts and minds.

One measure the United States might take to guarantee the supply of strategic minerals would be to work with partners (the EU, World Bank, China and others) to develop infrastructure - electricity, railroads, roads, water and dams as well as mining skills and other human infrastructure – all of which are

important in expanding production and supply. A recent example was a loan from the US Ex-Im Bank to fund the development of a South African power station.

A high-risk, high-reward project that could dramatically expand production and supply of minerals is the Inga Dam project. At present, international efforts are assisting the DRC to regenerate phases I&II, which were dramatically reduced during the civil war from 1996 to 2005. The United States and its international partners could also assist with Phase III and Grand Inga. Once completed, Inga and Grand Inga could supply all of Africa's electricity and permit the expansion of the production of strategic minerals and metals.⁷⁹ However, given the Congolese government's questionable behavior towards First Quantum and other companies, risk is involved in investing in Inga and other large-scale projects. A step-by-step approach might work better, first with the revamping of the national electricity company and second with the restoration of Phases I&II to full capacity. African pension funds could provide part of the needed investment.⁸⁰

The United States has some influence with the South African government. The US African Growth and Opportunity Act (AGOA) has benefited South Africa and other Southern African countries with tariff free entry for its goods into the United States. In the renewal of AGOA before 2015, the United States has leverage that can be used against mine nationalization and resource nationalism, especially in South Africa. The African Growth and Opportunity Act (AGOA) has greatly benefitted South African exporters. The United States should negotiate a bilateral trade agreement with South Africa, including a provision for strategic minerals.⁸¹

South African Mining Resources Minister Susan Shabangu and other officials would like to move South Africa from the bottom quartile of Fraser Institute rankings to the top quartile in four years. The United States could work with the South African government to improve the country's attractiveness to mining investors.⁸²

A new beneficiation law has been passed which means that the South African government will support processing, smelting and manufacturing of metals in the country.⁸³ In regard to "beneficiation," officials in South Africa's Department of Trade and Industry and South African industries have expressed preference for all five stages of processing, smelting and manufacturing of metal to be developed inside the country. However, there are major challenges for ferroalloy and PGM beneficiation, especially ESKOM electricity shortages and South Africa's impending laws against climate change limiting greenhouse gas emissions. Also, the financial sector would rather support the exporting of ore rather than further beneficiation, which is not profitable. It would be better for the United States to assist in the development of infrastructure to expand supply than assist costly and unprofitable beneficiation in order to ensure long term access to strategic metals.⁸⁴

Other measures the United States could take include negotiating off-take agreements with South Africa. The United States could provide incentives for American mining companies to reengage in South Africa and finance highly visible projects that resonate with US companies.⁸⁵ Also, American stock exchanges could be enabled to provide more risk capital for Southern African ventures, as does the Toronto Stock Exchange.⁸⁶ Also, the US government could step up diplomatic efforts to dissuade the ANC from moving towards nationalization.

In the DRC, the United States will continue to work with the IMF, the EU and other partners to keep the Kabila regime committed to free market principles, prevent abuses like the First Quantum expropriation, and rein in massive off-take deals, like Sicominex with China. However, US companies are now restricted by the Dodd-Frank Act from being “more aggressive” like Chinese companies. There are a number of mining industry experts who believe that the Act should be reviewed in regard to how it is being applied in the DRC. Other experts think that it would be worthwhile for the United States to work with its partners (and China) in upgrading the DRC’s infrastructure.

In Zimbabwe, the United States can continue to work against the implementation of the indigenization law. There are those who believe that Mugabe and ZANU-PF are bluffing about indigenization and that the richness and accessibility of PGM deposits will insure US access for years and even decades to come. However, the United States has limited leverage, since US and EU sanctions have been in place against Mugabe and his inner circle for a decade. The United States has worked to support the Movement for Democratic Change (MDC) and hopes that the MDC wins the 2012 elections, which would open up Zimbabwe to greater US and Western influence. South Africa and its regional allies have been pushing the full implementation of the 2008 power-sharing arrangement, which would swing the balance towards the MDC. Therefore, it is plausible that the days of Mugabe and ZANU-PF are numbered and that the MDC will assume power.

However, the United States must be on guard against the possibility of a coup by Mugabe’s security forces, another spiral of degeneration, and turn towards dependence on China. Zimbabwe has suffered a collapsed economy, is a failed state, and will take years to rebuild, even if the MDC takes power in 2012.⁸⁷ Thus, the United States must be prepared for a range of possibilities.

US INDUSTRIAL POLICY AND STRATEGIC MINERALS

For years now, the lack of a US industrial policy including strategic minerals has hampered efforts to guarantee the supply of minerals and could be damaging in the future. However, China’s monopoly of and export controls on rare earth minerals have spurred moves towards an industrial policy that guarantees access to those minerals. The rare earths crisis that China inflicted on Japan in late 2010 gave rise to new policy measures.⁸⁸ Japan,⁸⁹ Korea, and the European Union already have minerals

policies and programs to secure such minerals. The US Congress has been considering a rare earths supply-chain bill and included measures in the 2012 Defense Authorization Act.⁹⁰ Given the context, the presentation by this author of research findings and policy prescriptions concerning US access to Southern African strategic minerals has found a receptive audience in the Defense Logistics Agency, US Geological Survey, State Department, and National Intelligence Council.⁹¹

The Center for New American Security report on strategic minerals made several recommendations concerning US policy towards strategic minerals. “First, the government and private sector should increase information sharing regarding mineral supply chains ... Second, governments should catalogue their dependencies on the most contentious minerals, such as rare earth elements and indium, for defense equipment needs and clean energy manufacturing goals. The US government is in the early stages of taking on this task...”⁹² The CNAS report concludes that “the government must improve its understanding of the kinds of economic and geopolitical risks that mineral import dependence could create when things go wrong. This will entail educating high-level policymakers and diplomats of the connections between the global minerals trade, defense industrial needs, and international politics.”⁹³

A US Geological Survey minerals expert commented that the problem with information-sharing is that “the USGS collects proprietary data from US companies on mineral and metal production and consumption that should not be compromised. The aggregated data is important to national security planning and since only that data are published by the USGS, companies’ confidential data are not compromised.”⁹⁴ He observed that there is the need for consensus about potential mineral issues, thereby “reducing the potential for an international misunderstanding or counter-productive interdepartmental bickering over which mineral is more important.” He commented that “the problem with US government contractors sharing raw materials data with the Department of Defense is that a contractor may not know what raw materials go into a weapon system.”⁹⁵

The minerals expert commented that it would serve US national security “to have complete and accurate information about national mineral and metal production and consumption for security, strategic planning, and stockpiling analysts to work with. Complete collection of such information would be greatly aided by requiring companies in the DoD and Department of Energy supply chain to report mineral and metal production and consumption to the USGS as a condition in accepting government contracts...”⁹⁶ The expert concluded that there are “tensions between security and the economic interests of business and industry. Maximizing profits may lead to supporting limited sources of raw materials that could result in supply chain vulnerability and reduced security. Is that issue best addressed at the point of supply (policies that support mining) or at the point of consumption (policies that encourage consumers to support production diversity in the supply chain)? Another situation might occur when a company needs a raw material that is supply-limited to produce its defense-related and commercial equipment. Privileged

access based on defense contracts could be abused to acquire materials for commercial production or to limit availability to a competitor.”⁹⁷ In sum, the United States should pursue an industrial policy concerning strategic minerals; however, there are numerous pitfalls in constructing and implementing such a policy that must be taken into account.

One fundamental problem is that China has been manufacturing more over the decades, and the United States has been manufacturing less, which does not bode well for US defense industries. The United States may eventually be unable to manufacture “defense critical” items, even if it is able to maintain access to strategic minerals. Therefore, the United States will either have to depend on China for metals and defense critical components or be forced to dismantle weapons systems. If the United States takes dramatic actions to reconstitute defense critical manufacturing and secure strategic minerals, the long-term crisis might be avoided.

In regard to issues about defense critical resources, it is possible for them to be forecasted and monitored, regulated and managed, and moderated to avoid or mitigate potential conflict. The United States, its allies, China and others could work together to identify future demand trends and work with Southern African suppliers to identify future sources of competition and conflict. Long-term sustainability practices could be developed and implemented in areas of critical resource distribution, including the development of alternative materials that do not use PGMs; for instance, the switch to electric cars could mean a phasing out of catalytic converters. Aggressive recycling could work for some strategic minerals but not for others.

FUTURE CONFLICT OVER STRATEGIC MINERALS AND THE ROLE OF THE US MILITARY

Future areas of conflict over strategic resources in Southern Africa will be concentrated in Chinese efforts to monopolize PGMs, chromium, manganese and cobalt and Southern African regime efforts to nationalize mining industries and make large off-take deals with China and other Asian nations. New battlegrounds may emerge over strategic resources in Southern Africa in the next twenty years or so. Southern Africa is a potential battleground, given the high concentration of certain strategic resources in the region and rising resource nationalism and encroachment of China.

The United States must prepare for conflict in attempting to compel China to not monopolize strategic minerals and Southern African regimes not to nationalize them and not divert resources away from the United States. One way to stop Chinese monopolistic behavior and biased, excessive Southern African off-take agreements would be to use the US Navy to block the shipment of minerals. While China is gaining greater access in Africa, the United States has the upper hand because the resources have to be transported from Southern Africa through the Indian Ocean and Strait of Malacca to Chinese ports. The

Chinese response could involve their navy attempting to defeat the US Navy; the “string of pearls” that China is developing could eventually help to offset US supremacy.⁹⁸

Southern African states could attempt to keep the United States out of the sub-region and withhold strategic minerals from the United States. In such a case, the United States may have to intervene in the sub-region. At the moment, these scenarios seem far-fetched and may never occur. However, from the 2020s onwards, the likelihood of conflict will exist.⁹⁹ At issue is how US agencies might adjust to the forthcoming challenges. The US National Security Council, DOD and US Africa Command (AFRICOM) might develop contingencies to deal with the eventual prospect of resource cutoffs and the possibility of conflict over strategic minerals.

It is possible that the Department of Defense can be transformed from old ways of thinking to posture for future scenarios involving natural resources. An example is Defense Logistics Agency Strategic Minerals, which has been pushing for a coordinated minerals policy. DOD and government structures are suited for reporting on emerging threats to strategic resources. DLA Strategic Minerals, US Geological Survey and other agencies conduct research, analysis and report on strategic minerals issues. However, there is limited coordination, and the National Security Council and National Intelligence Council have more immediate concerns than strategic minerals. In Congress, interest resides in those who represent districts with high concentrations of defense industries, such as shipbuilding in Pascagoula, Mississippi.

US defense planning, resource allocation decisions, force structure, and education and training investments are not sufficiently reflective of emerging threats to strategic resources, because the threats are still ephemeral and long term in nature. However, as the case of rare earth minerals demonstrates, the Department of Defense and other agencies can develop policy awareness and options for dealing with challenges.¹⁰⁰

The US combatant command structure and AFRICOM, in particular, are flexible enough to adapt to conflicts over resources. At present, these are early stages for AFRICOM as a combatant command as well as the problem of strategic minerals. The building of military-to-military relations could assist the United States in preparing and shaping the African environment for the eventual struggle over minerals and possible conflict. The US combatant command structure and AFRICOM, in particular, are not too rigid and can be adapted to meet the challenges of resource conflict, as long as the State Department and other agencies are involved. However, if AFRICOM is down-sized or folded into another command, it might be more difficult to deal with future conflict.

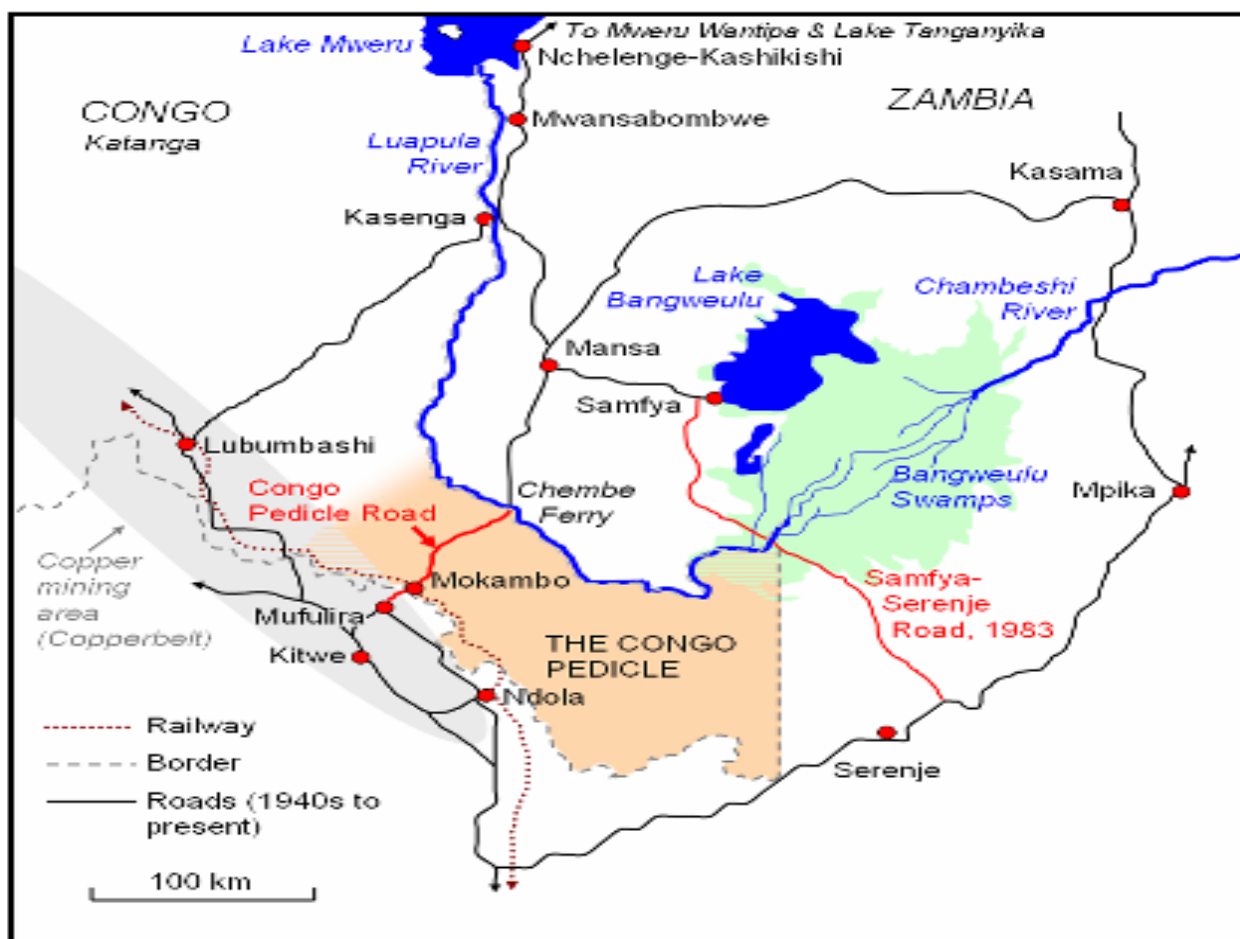
The building of strategic partnerships on a regional basis with the Southern African Development Community (SADC) is politically difficult, given South Africa and the ANC regime’s rejection of AFRICOM during the standup process in 2007 and 2008. South Africa is the hegemon in the region and

must fully accept AFRICOM before military-to-military partnerships can be built throughout the region. The United States also continues to apply sanctions against President Robert Mugabe of Zimbabwe and his inner circle, which makes building mil-to-mil partnerships with the SADC difficult. In addition, there is some resistance to US foreign policy and AFRICOM from the Kabila regime in the DRC, the SWAPO government in Namibia, and the dos Santos regime in Angola. By the 2020s, US intervention might be needed to ensure sustained US and allied access to Southern African strategic minerals, which means that the building of strategic partnerships in the next decade is important. Building partnerships with Southern African countries will continue to be difficult, and AFRICOM could become an increasingly important player in this challenging process. Finally, the formulation and execution of a sound strategic communications plan is important to moderate Chinese involvement and ensure sustained access to Southern African mineral resources.

CONCLUSION

This report has demonstrated that resource nationalism and Chinese demand-driven activities are two main factors which may restrict US access to strategic minerals in Southern Africa. In particular, China is establishing dominance over the supply of strategic minerals through off-take agreements and through entering the mining industries in the DRC, Zimbabwe and Zambia. In contrast, Chinese efforts to enter the South African mining industry are being resisted by the South African government. Instead, Chinese companies are able to secure off-take agreements for strategic minerals. This will mean that Chinese efforts to monopolize PGMs and ferroalloys from South Africa will be accomplished through off-take agreements rather than through joint ventures. In any event, Chinese demand-driven activities pose a long-term threat to the supply of strategic minerals to the United States. Greater attention to this matter today will prevent a greater expenditure of blood and treasure in the future.

Appendix A:
Map of Copper and Cobalt regions of Katanga Province, Democratic Republic of the Congo and
Copperbelt Province, Zambia¹⁰¹



ENDNOTES

¹ Stephen Burgess, *Sustainability of Strategic Minerals in Southern Africa and Potential Conflicts and Partnerships*, Institute of National Security Studies Research Paper, 2010.

<http://www.usafa.edu/df/inss/Research%20Papers/2010/Report%20Burgess%20Southern%20Africa%20Strategic%20Minerals.pdf>.

² September 2011 Briefings to Agencies in the Washington, DC area: Defense Logistics Agency, Strategic Minerals, Fort Belvoir; US Geological Survey, Reston; US Department of State; Office of the Secretary of Defense-Africa, The Pentagon; Africa Center for Strategic Studies; Army Environmental Policy Institute, Fort Belvoir.

³ Christine Parthemore, *Elements of Security: Mitigating the Risks of US Dependence on Critical Minerals*, Center for New American Security Report, May 12, 2011. <http://www.cnas.org/elementsofsecurity>.

⁴ "Reconfiguration of the National Defense Stockpile Report to Congress," April 2009, http://www.acq.osd.mil/ip/docs/nds_reconfiguration_report_to_congress.pdf. Defense National Stockpile Center (now DLA Strategic Materials), Defense Logistics Agency, Ft. Belvoir, VA.

The Department of Defense's Approximate Annual Usage of Standard Materials that are concentrated in Southern Africa: #7 in rank of DoD usage is Manganese Ore Chem/Metal Grade - 25,041.8 short tons per year; #9 is Chromium Ferro (Ferrochromium) - 9,667.8 short tons per year; #10 is Chromite Ore (all grades) - 9,630.5. Others include Chromium Metal 913.8 short tons per year; Manganese Ferro (C and Si) 7,897.0 short tons per year; Vanadium 134.8 short tons per year; Platinum (Platinum Group) .8 short tons per year; Palladium (Platinum Group) 2.3 short tons per year; Iridium (Platinum Group) - .3 short tons per year; Titanium mineral concentrates and Fluorspar.

⁵ In regard to demand constraints, in the October 2010 Research Paper, the increased uses of PGMs were described and analyzed, including the effect on future supply, especially of the minor PGMs. Hi tech components, batteries and fuel cells were among the applications mentioned. One possible remedy for future supply bottlenecks would be recycling. Questions include what minerals can be economically recycled and to what extent? Also, what do demand trends say for PGMs, chromium, manganese and cobalt?

⁶ India, South Korea, Malaysia, Brazil, Russia, Kazakhstan and other countries are also seeking minerals. For relevant news stories, see *Africa-Asia Confidential*.

⁷ Roger Baxter, Chief Economist, Chamber of Mines, Johannesburg, interviewed June 9, 2011.

⁸ Peter Leon, Partner and Co-Head of Mining, Energy and Natural Resources, Webber Wentzel, Johannesburg, interviewed June 7, 2011.

⁹ Theresa Meyer, Spokesperson, Columbus Stainless Steel, Witbank, telephone interview, June 2, 2011.

¹⁰ "Namibia: Existing Licences not Affected by New Mining Law," *SteelGuru*, May 18, 2011.

http://www.steelguru.com/raw_material_news/Namibia_existing_licenses_not_affected_by_new_mining_law/205767.html.

¹¹ Assis Malaquias, *ACSS Research Paper, Stress-Testing South Africa: The Tenuous Foundations of One of Africa's Stable States*, Africa Center for Strategic Studies, August 2011. <http://africacenter.org/2011/08/stress-testing-south-africa-the-tenuous-foundations-of-one-of-africa%e2%80%99s-stable-states/>.

¹² African National Congress, "New Growth Plan," *ANC NEC Bulletin*, January 2011. <http://www.anc.org.za/docs/necbul/2011/januaryx.pdf>.

¹³ "Nationalisation in South Africa: A Debate that will persist," *The Economist*, December 3, 2011.

¹⁴ Peter Leon, *The South African mining industry - where to now?* Address to International Platinum Group Metals Association Annual Dinner, London, 17 May 2011.

¹⁵ Leon, *The South African mining industry*. The Pretoria High Court's ruling of April 28, 2011 in the case of AgriSA's coal mining rights stated that "its coal rights had been legislated out of existence."

¹⁶ Leon, *The South African mining industry*.

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- ¹⁷ In May 2011, the African Exploration exemption was withdrawn by the Mining Resources minister, Susan Shabangu. <https://www.moneyweb.co.za/mw/view/mw/en/page295025?oid=533229&sn=2009+Detail&pid=289766>.
- ¹⁸ Michael Spicer, Vice President, Business Leadership South Africa, Johannesburg, interviewed June 3, 2011.
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- ²⁰ "Shabangu Warns on Mining Safety," *Business Day*, October 4, 2011. Both platinum and gold mining are inherently dangerous, given the depth and heat in the mines. Mining industry experts point out that it is impossible to maintain perfect safety and profitability at the same time.
- ²¹ Tim Cohen, Editor, *Business Day*, telephone interview, May 20, 2011.
- ²² Iraj Abedian, Economist, CE Pan-African, Johannesburg and government advisor, interviewed June 8, 2011.
- ²³ Roger Baxter, June 9, 2011. Godfrey Gomwe Executive Director of Anglo American South Africa, Johannesburg, interviewed June 10, 2011.
- ²⁴ Godfrey Gomwe, June 10, 2011. Tim Clark, Deutsche Bank, Johannesburg, interviewed August 2010.
- ²⁵ "Nationalisation in South Africa," *The Economist*.
- ²⁶ Steve Shepherd, Mining Analyst, JP Morgan, Johannesburg, interviewed May 31, 2011.
- ²⁷ Greg Mills, Director, Brenthurst Foundation, Johannesburg, interviewed June 1, 2011. Rob Still, Chair and Chief Executive, Pangea Exploration Group, Johannesburg, interviewed June 9, 2011. Michael Spicer, June 3, 2011. Godfrey Gomwe, June 10, 2011. Bloomberg News correspondent, Johannesburg, interviewed May 30, 2011.
- ²⁸ Catherine Keene, Mining Lawyer, Taback and Associates Law Firm, Johannesburg, interviewed June 2, 2011.
- ²⁹ Peter Leon, interviewed June 7, 2011.
- ³⁰ Fred McMahon, Fraser Institute, Toronto, Canada, email message and interview by telephone, August 8, 2011.
- ³¹ Tim Aiken, Marketing Director, Anglo Platinum, Johannesburg, interviewed June 2, 2011. Anglo Platinum, which is part of the Anglo-American Corporation, is by far the largest player in South African platinum mining and is much less-exposed to risk in Zimbabwe than is Impala Platinum.
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- ³³ Derek Engelbrecht, Marketing Executive, Impala Platinum Holdings, Ltd., Johannesburg, telephone interview, May 30, 2011.
- ³⁴ "Zimbabwe: 'Mulling Ban on Raw Platinum Exports,'" *Radio Netherlands Worldwide*, December 28, 2011.
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- ³⁶ Brian Latham, Bloomberg News, Johannesburg, interviewed May 30, 2011.
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- ³⁹ Elizabeth Jaffee, US Embassy, Kinshasa, briefing on March 15, 2011.
- ⁴⁰ Rob Still, June 9, 2011.
- ⁴¹ Executive, Metorex, Ltd., Johannesburg, interviewed May 31, 2011.
- ⁴² Jennifer C. Li, *China's Rising Demand for Minerals and Emerging Global Norms and Practices in the Mining Industry*, USAID, FESS, Working Paper 2, 2006.
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- ⁴⁶ Hume Scoles, Senior Partner, Malan Scoles Attorneys, June 9, 2011.
- ⁴⁷ Lara Smith, June 7, 2011. Metorex Executive, May 31, 2011.
- ⁴⁸ "Metorex Listing to be Suspended in Jan," *Business Live*, December 28, 2011.
http://www.businesslive.co.za/southafrica/sa_companies/2011/12/28/metorex-listing-to-be-suspended-in-jan.
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- ⁵² Map of Congo Pedicle Road, Congo-Zambia showing Copperbelt, Luapula River with main roads and railway, Created by User: Rexparry_sydney, February 11, 2007.
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- ⁵⁵ Johanna Johansson, "Patterns of Chinese Investment, Aid and Trade in Central Africa (Cameroon, the DRC and Gabon)," briefing paper for the World Wildlife Fund, Stellenbosch, Centre for Chinese Studies, August 2009, 11-17.
- ⁵⁶ Johansson, "Patterns of Chinese Investment," 11-17.
- ⁵⁷ Claude Kabemba, Southern African Resource Watch, Johannesburg, interviewed August 27, 2010 and June 8, 2011.
- ⁵⁸ Nieuwoudt, "Pros and Cons to Huge Chinese Investment in DRC."
- ⁵⁹ Metorex Executive, May 31, 2011.
- ⁶⁰ "ZIMASCO Imports Coal," *Zimbabwe Independent*, 18 August 2011.
- ⁶¹ Rob Still, June 9, 2011.
- ⁶² Stainless steel industry experts.
- ⁶³ Peter Leon, interviewed June 7, 2011.
- ⁶⁴ Michael Spicer, June 3, 2011.
- ⁶⁵ Greg Mills, June 1, 2011.
- ⁶⁶ Haglund, "Regulating FDI in weak African states," 547-575.
- ⁶⁷ John Lungu and Sumbye Kapena, "South African Mining Companies Corporate Governance Practice in Zambia: The Case of Chibuluma Mine Plc.," in Kabemba and Southall, eds., *South African Mining Companies in Southern Africa*, 47-88.
- ⁶⁸ Roger Baxter, June 7, 2011.
- ⁶⁹ Metorex Executive, May 31, 2011.
- ⁷⁰ Elsewhere in Southern Africa, unions are weaker and labor costs more competitive, but corruption is higher. Also, Southern African mines are subject to mineworkers' strikes. However, government regulation is weaker.

⁷¹ Fraser Institute.

⁷² New Growth Plan, South Africa.

⁷³ Steve Shepherd, May 31, 2011.

⁷⁴ Department of Mineral Resources officials, in a meeting in Pretoria in August 2010, commented that Chinese officials had visited the ministry every week whereas my group was the first American visit to the ministry in eight years.

⁷⁵ The one exception is Freeport MacRohan, which is operating the Tenke Fungurume copper/cobalt mine in Katanga.

⁷⁶ *Africa-Asia Confidential*.

⁷⁷ Lara Smith, June 7, 2011, argued for repealing the Dodd-Frank Act's restrictions on importing strategic minerals from the DRC, due to the fact that Chinese interests have moved in and are buying up DRC minerals. In an opposing view, Claude Kabemba, June 9, 2011, believed that Dodd-Frank would improve transparency in the DRC.

It is possible that the Dodd-Frank Act could negatively affect the US company, Freeport MacRohan, and its Tenke Fungurume copper/cobalt mine, which has benefited from US government assistance.

⁷⁸ Briefing on Zambian Economics, US Embassy, Lusaka, Zambia, March 22, 2011.

⁷⁹ Metorex Executive, May 31, 2011.

⁸⁰ Claude Kabemba, June 9, 2011.

⁸¹ Peter Leon, June 7, 2011.

⁸² Hume Scoles, June 10, 2011 and Peter Leon, June 7, 2011. Peter Leon proposed that conferences be convened in the United States and elsewhere to bring together Southern African mining industry experts from various parts of the world to examine future prospects and policy options.

⁸³ Henry Lazenby, "South Africa Finalising Beneficiation Action Plan," *Mining Weekly*, October 13, 2011. <http://www.miningweekly.com/article/south-africa-finalising-beneficiation-action-plan-2011-10-13>.

⁸⁴ Roger Baxter, interviewed June 9, 2011.

⁸⁵ Godfrey Gomwe Executive Director of Anglo American South Africa, Johannesburg, interviewed June 10, 2011.

⁸⁶ Tanneke Heersche, Fasken Martineau law firm, Johannesburg, interviewed June 3, 2011.

⁸⁷ Greg Mills, June 1, 2011.

⁸⁸ Parthemore, *Elements of Security*. Executive Summary.

⁸⁹ In Japan, the Ministry of Economy, Trade and Industry (METI) and the Japan Mining Engineering Center for International Cooperation (JMEC) are involved in strategic minerals policy.

⁹⁰ "Defense bill calls for rare earths stockpile," December 16, 2011, *AMM.com* <http://www.amm.com/Article/2950611/Defense-bill-calls-for-rare-earths-stockpile.html> . The 2012 National Defense Authorization Act includes two amendments that could boost domestic reserves of rare earths. Section 835 of the bill requires the Defense Logistics Agency Strategic Materials office administrator to submit a plan to establish an inventory of rare earth materials required for national defense. It also requires the Secretary of Defense to determine whether to execute the plan within 90 days. The second amendment requires the Secretary of Defense to submit to Congress a report on the feasibility of recycling, recovering and reprocessing rare earth elements, including neodymium-iron-boron magnets used in weapon systems.

⁹¹ September 2011 Briefings to Agencies in the Washington, DC area: Defense Logistics Agency, Strategic Minerals, Fort Belvoir; US Geological Survey, Reston; US Department of State; Office of the Secretary of Defense-Africa, The Pentagon; Africa Center for Strategic Studies; Army Environmental Policy Institute, Fort Belvoir.

⁹² Parthemore, *Elements of Security*, Executive Summary.

⁹³ Parthemore, *Elements of Security*, Executive Summary.

⁹⁴ US Geological Survey (USGS) official, email correspondence, May 17, 2011.

⁹⁵ USGS official, May 17, 2011.

⁹⁶ USGS official, May 17, 2011.

⁹⁷ USGS official, May 17, 2011.

⁹⁸ Christopher J. Pehrson, "String of Pearls: Meeting the Challenge of China's Rising Challenge across, the Asian Littoral," US Army Strategic Studies Institute, July 2006.
<http://www.strategicstudiesinstitute.army.mil/pdffiles/pub721.pdf>.

⁹⁹ Peter Leon, June 7, 2011.

¹⁰⁰ Congress determined that rare earths are: scandium, yttrium, lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium.

¹⁰¹ Map of Congo Pedicle Road, Congo-Zambia showing Copperbelt, Luapula River with main roads and railway, Created by User: Rexparry_sydney, February 11, 2007.